

SEMINAR

Grupo de Análise Funcional e Aplicações Functional Analysis and Applications Group

Deformed orthogonal polynomials on the real line

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Abstract

The construction of families of orthogonal polynomials on the real line from a given system of orthogonal polynomials or from a given modified orthogonalizing measure has been subject of many studies. Well-known connections with integrable systems, Painlevé equations (discrete and continuous), random matrices, and many other topics from the literature of Mathematical-Physics have been recently studied.

In this talk we focus on the so-called Laguerre-Hahn class on the real line, that is, the sequences of orthogonal polynomials whose Stieltjes functions satisfy a Riccati type differential equation with polynomial coefficients. We shall take Stieltjes functions subject to a deformation parameter, t , and we derive systems of differential equations and give Lax pairs, yielding non-linear differential equations in t for the recurrence relation coefficients and Lax matrices of the orthogonal polynomials.

A specialisation to a non semi-classical case obtained via a Möbius transformation of a Stieltjes function related to a modified Jacobi weight is studied in detail, showing that such a system is governed by a differential equation of the Painlevé type P_{VI} .

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